WHAT IS CLAIMED IS:

1. An IF receiver comprising:

an amplifier for receiving an analog input signal and amplifying the received analog signal;

an I-mixer coupled to the amplifier for down converting the input signal to a first lower frequency signal;

a Q-mixer coupled to the amplifier for down converting the input signal to a second lower frequency signal;

a channel selector filter coupled to the I-mixer and the Q-mixer for selecting a desired frequency channel for the first lower frequency signal for generating an I signal and selecting a desired frequency channel for the second lower frequency signal for generating a Q signal;

an IF demodulator for receiving the I signal and the Q signal and extracting information from the input signal responsive to the I signal and Q signal; and

a RC calibration for tuning the receiver.

2. The IF receiver of claim 1, wherein the IF demodulator comprises:

a first IF differentiator for differentiating the I signal;

a second IF differentiator for differentiating the Q signal;

a cross-coupled multiplier for multiplying the differentiated I signal with the I signal and multiplying the differentiated Q signal with the Q signal to extract frequency information from the I signal and the Q signal; and

a slicer for converting the frequency information to digital data.

3. The IF receiver of claim 2, wherein each of the first and second IF differentiators comprises:

an operational amplifier for receiving an input signal and generating an output signal at an output node;

a first resistor coupled in parallel between the output node and a negative input;

a capacitor coupled between the native input and the input signal; and

a second resistor coupled between the negative input and Q signal.

4. The IF receiver of claim 3, wherein frequency response for each of the first and second IF differentiators is defined by:

$$\frac{V_o}{V_i}(jw) = -jRC\left(w - \frac{1}{R_1 C}\right) \qquad (1)$$

where V_o is the output signal, V_1 is the input signal, R, R_1, and C are the values for the first resistor, the second resistor, and the capacitor respectively.

5. The IF receiver of claim 2, wherein the slicer comprises:

a peak detector for receiving an analog data input and a slow/fast signal for generating a peak signal responsive to peak of the analog data input signal;

a valley detector for receiving an analog data input and a slow/fast signal for generating a valley signal responsive to valleys of the analog data input signal;

an offset tracker coupled to the output of the peak detector and the output of the valley detector for taking the average of the peak signal and the valley signal; and

a comparator coupled to the output of the offset tracker and the analog data input for generating a high signal if the analog data input is higher than its average value, and generating a low signal if the analog data input is lower than its average value.

6. The IF receiver of claim 5, wherein the peak detector comprises:

a capacitor driven by a current source;

a first discharge current for discharging the capacitor selectable by a first switch; and

a second discharge current for discharging the capacitor selectable by a second switch, wherein the first switch and the second switch are adaptively activated to selectively discharge the capacitor either in a fast discharge mode by the first discharge current or a slow discharge mode by the second discharge current.

7. The IF receiver of claim 2, wherein the IF demodulator further comprises a band pass filter for shaping the I signal and the Q signal.

8. The IF receiver of claim 1, further comprising:

a first limiter for amplifying the I signal; and

a second limiter for amplifying the Q signal.

9. A method for demodulating an IF FSK signal comprising the steps of:

receiving an IF I signal input and an IF Q signal input;

differentiating the I signal at the frequency of the I signal by a first IF differentiator;

differentiating the Q signal at the frequency of the Q signal by a second IF differentiator;

multiplying the differentiated I signal with the I signal and multiplying the differentiated Q signal with the Q signal for extracting frequency information from the I signal and the Q signal; and

converting the frequency information to digital data.

10. The method of claim 9, wherein the step of differentiating the I signal comprises the step of applying a transfer function of

$$\frac{V_o}{V_i}(jw) = -jRC\left(w - \frac{1}{R_1C}\right) \qquad (1)$$

to the I signal.

11. The method of claim 9, wherein the step of differentiating the Q signal comprises the step of applying a transfer function of

$$\frac{V_o}{V_i}(jw) = -jRC\left(w - \frac{1}{R_1C}\right) \qquad (1)$$

to the Q signal.

12. The method of claim 9, wherein the step of converting the frequency information to digital data comprises the step of

receiving an analog data input and a slow/fast signal for generating a peak signal responsive to peak of the analog data input signal;

receiving an analog data input and a slow/fast signal for generating a valley signal responsive to valleys of the analog data input signal;

taking the average of the peak signal and the valley signal; and

generating a high signal if the analog data input is higher than its average value, and generating a low signal if the analog data input is lower than its average value.

13. The method of claim 9, further comprising the step of amplifying the I signal and the Q signal.

14. An IF demodulator comprising:

a first IF differentiator for differentiating an I signal;

a second IF differentiator for differentiating a Q signal;

a cross-coupled multiplier for multiplying the differentiated I signal with the I signal and multiplying the

differentiated Q signal with the Q signal to extract frequency information from the I signal and the Q signal; and

a slicer for converting the frequency information to digital data.

15. The IF demodulator of claim 14, wherein each of the first and second IF differentiators comprises:

an operational amplifier for receiving an input signal and generating an output signal at an output node;

a first resistor coupled in parallel between the output node and a negative input;

a capacitor coupled between the native input and the input signal; and

a second resistor coupled between the negative input and Q signal.

16. The IF demodulator of claim 15, wherein frequency response for each of the first and second IF differentiators is defined by:

$$\frac{V_o}{V_i}(jw) = -jRC\left(w - \frac{1}{R_1 C}\right) \quad (1)$$

where V_o is the output signal, V_i is the input signal, R, R_1, and C are the values for the first resistor, the second resistor, and the capacitor respectively.

17. The IF demodulator of claim 14, wherein the slicer comprises:

a peak detector for receiving an analog data input and a slow/fast signal for generating a peak signal responsive to peak of the analog data input signal;

a valley detector for receiving an analog data input and a slow/fast signal for generating a valley signal responsive to valleys of the analog data input signal;

an offset tracker coupled to the output of the peak detector and the output of the valley detector for taking the average of the peak signal and the valley signal; and

a comparator coupled to the output of the offset tracker and the analog data input for generating a high signal if the analog data input is higher than its average value, and generating a low signal if the analog data input is lower than its average value.

18. The IF demodulator of claim 17, wherein the peak detector comprises:

a capacitor driven by a current source;

a first discharge current for discharging the capacitor selectable by a first switch; and

a second discharge current for discharging the capacitor selectable by a second switch, wherein the first switch and the second switch are adaptively activated to selectively discharge the capacitor either in a fast discharge mode by the first discharge current or a slow discharge mode by the second discharge current.

19. The IF demodulator of claim 14, further comprising a band pass filter for shaping the I signal and the Q signal.

20. The IF demodulator of claim 14, further comprising a low pass filter for filtering noise.